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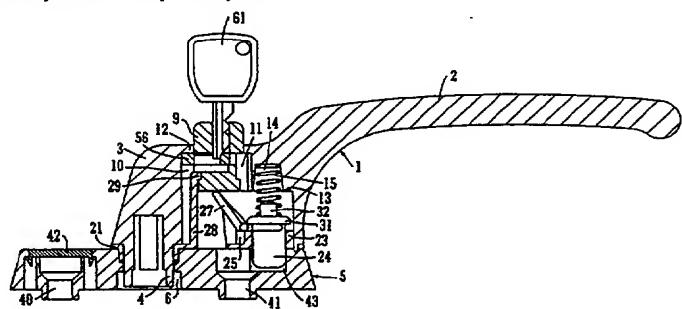
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(54) Abstract Title
A lockable handle with pivot lever and closure plate

(57) A lockable handle assembly comprising:

- (i) a handle body (1) pivotally mountable on a substrate (5);
- (ii) a cavity (7) extending through the handle body (1) and open towards the substrate (5);
- (iii) a lock barrel (9) slidable in the cavity parallel to the pivot axis of the handle (1) and rotatable between a locked position and an unlocked position;
- (iv) a bolt (24) slidable in the cavity (7) between an extended and retracted position, the sliding movement being parallel to but offset from that of the barrel (9), the bolt being spring urged to the extended position and having latching engagement with the substrate (5);
- (v) a pivoted lever (27), one end of which is acted upon by the barrel (9) and the other which engages the bolt (24); and
- (vi) a shaped closure plate (20) for closing the cavity (7), said closure plate having structures integrated therewith and projecting therefrom into the cavity, one of said structures (25) providing a fulcrum for the pivoted lever and the other (28) providing a locking portion (2) for engaging the lock barrel (9) in the locked position.

In the embodiment described, the lock barrel (9) has a surface configuration which engages the locking portion (28) of the closure plate (20) when the barrel (9) is in one orientation but which is disengaged therefrom when the barrel is rotated through 180 degrees, and there is a keeper (56) receivable in a chamber in the barrel (9) and moveable transversely of the barrel between a projecting position in which a locking portion if the keeper projects from the barrel and engages one of two receivers in the handle body (1), and a housed position in which the keeper (56) is withdrawn substantially inside the barrel (9), the keeper being moveable to and retainable in the housed position by a key 61).



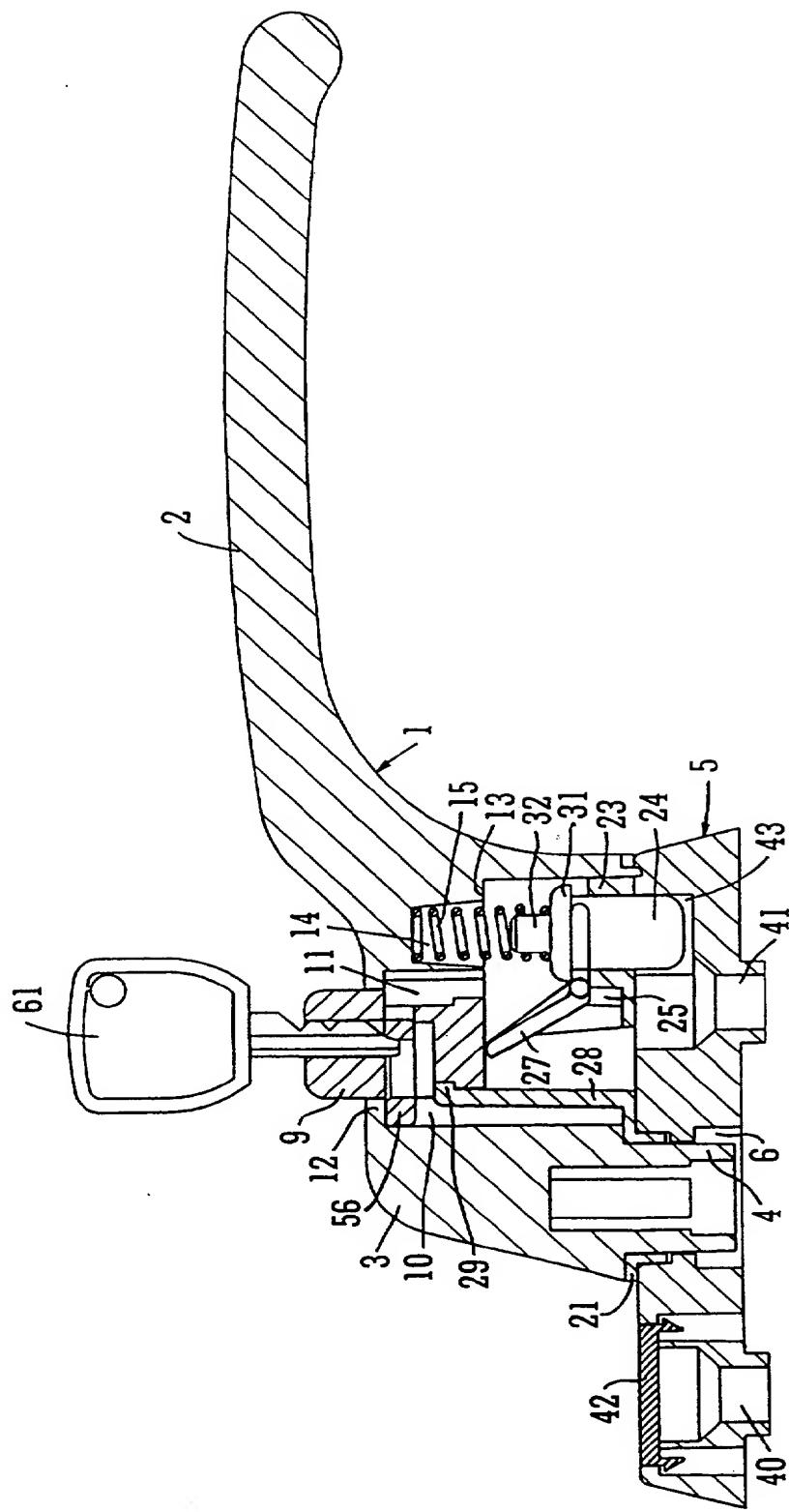


FIG. 1

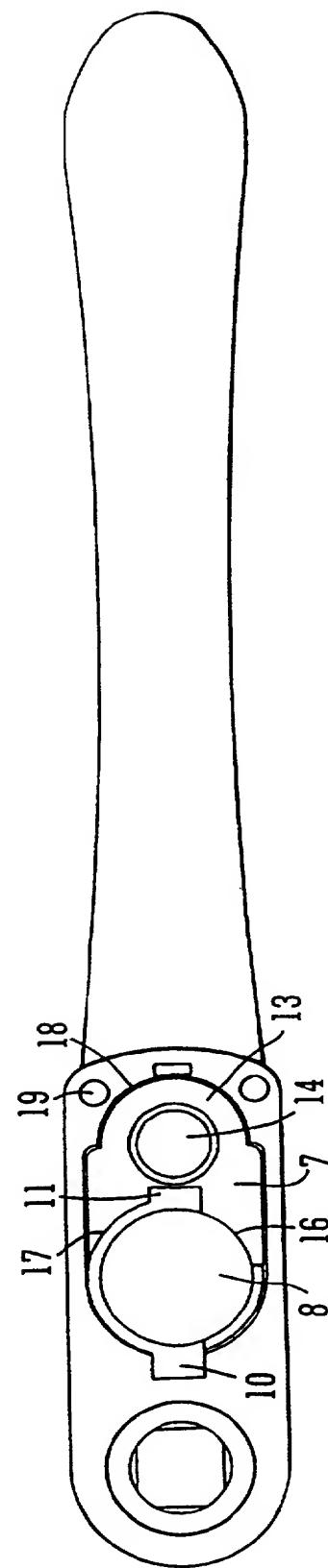
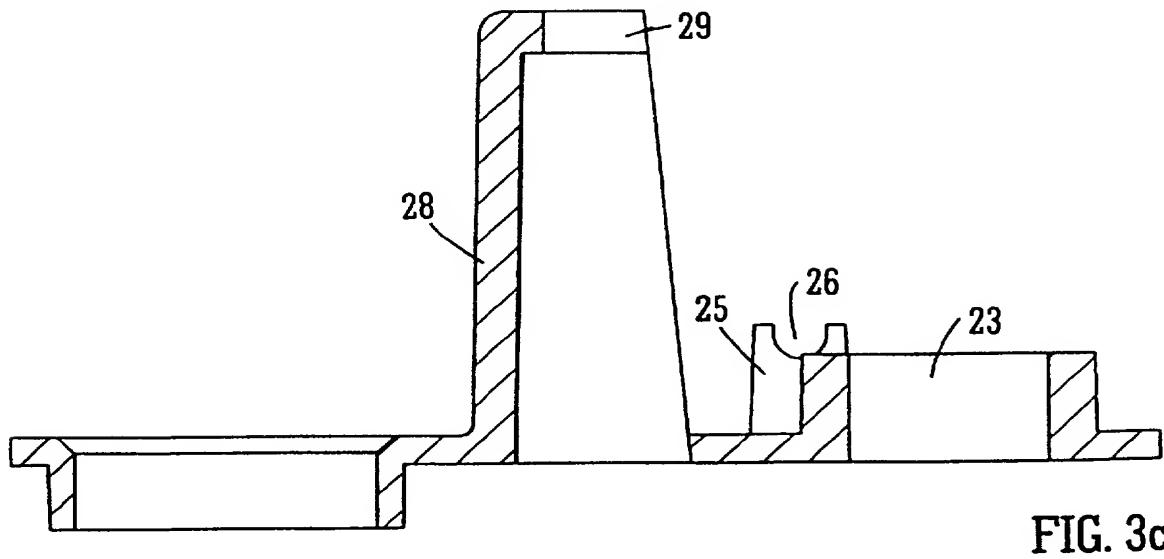
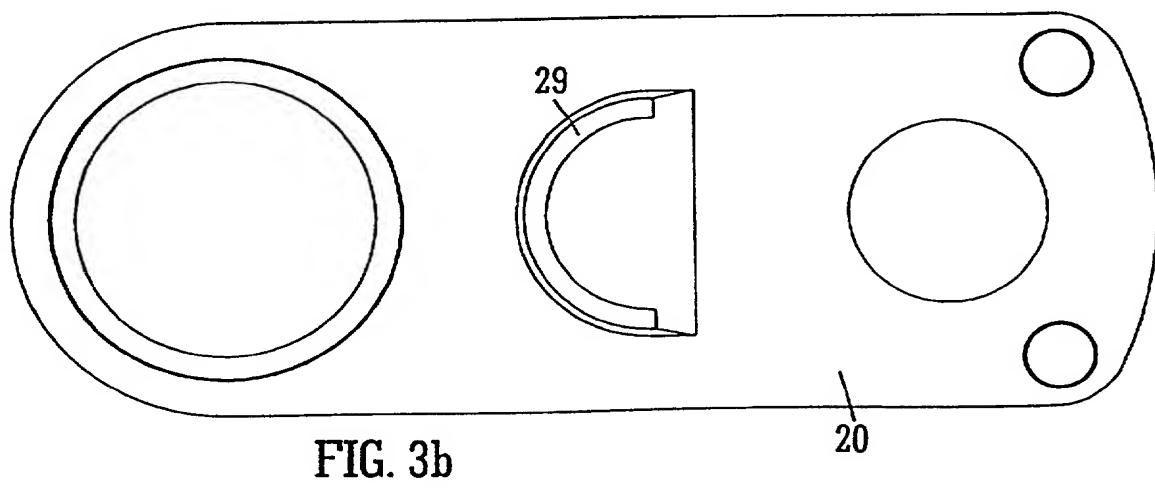
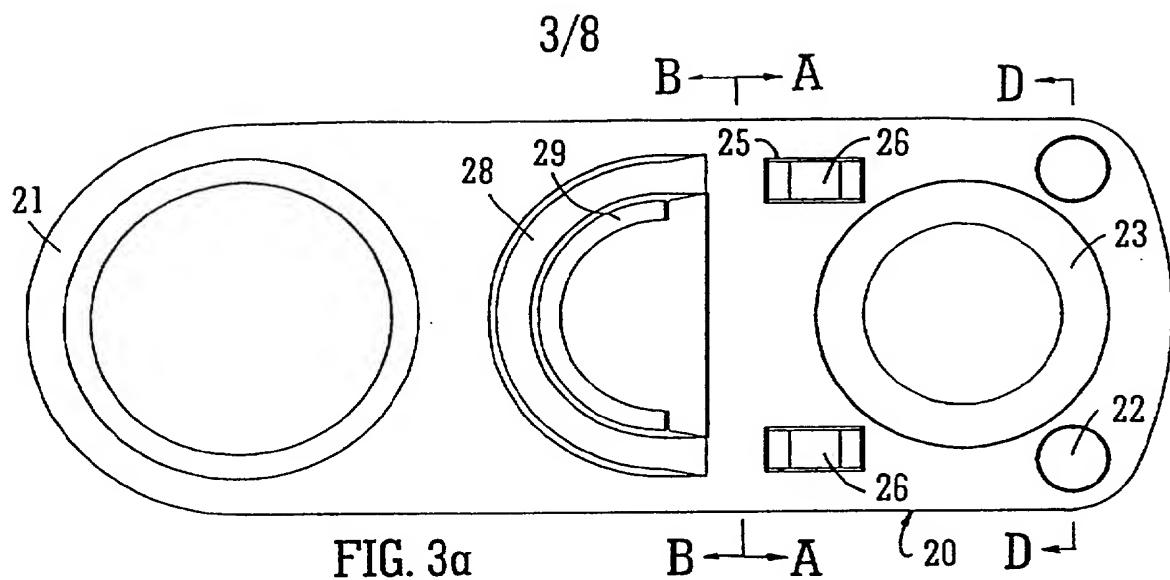


FIG. 2



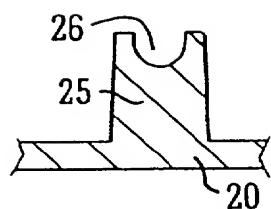


FIG. 3d

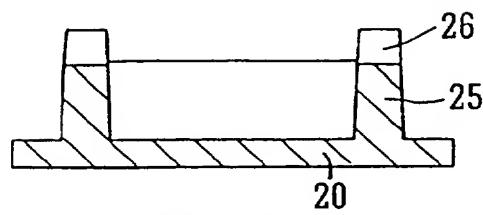


FIG. 3e

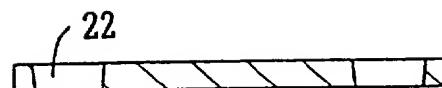


FIG. 3f

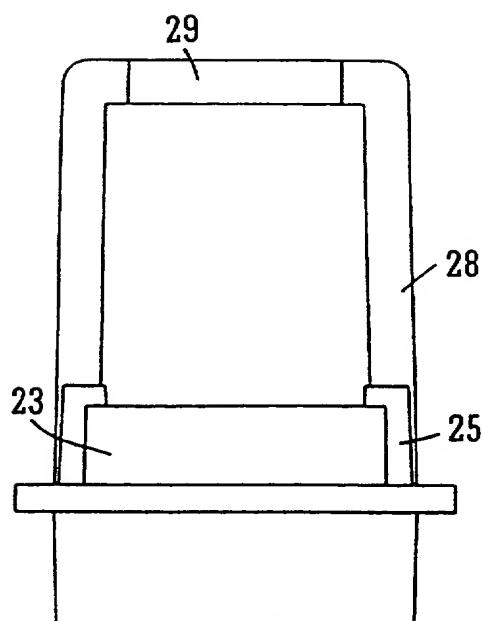


FIG. 3g

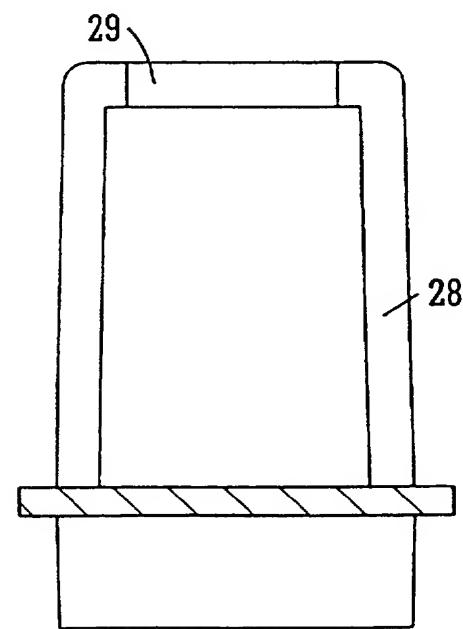


FIG. 3h

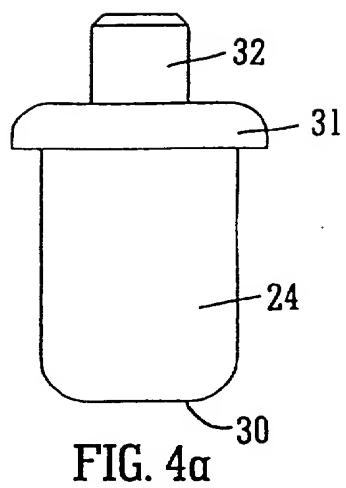


FIG. 4a

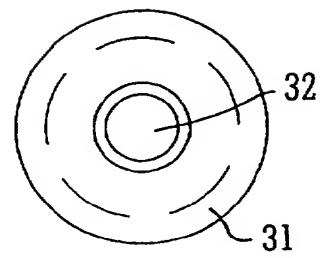


FIG. 4b

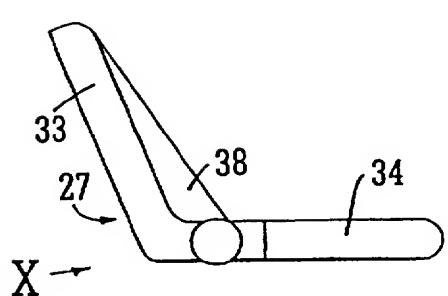


FIG. 5a

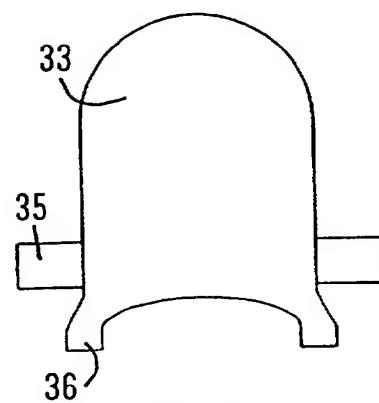


FIG. 5b

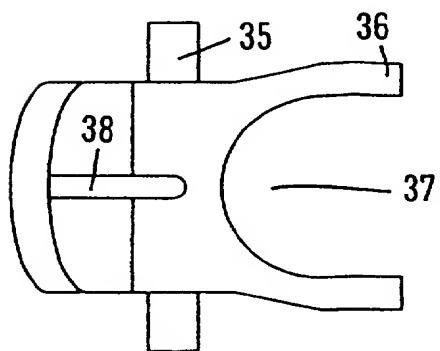


FIG. 5c

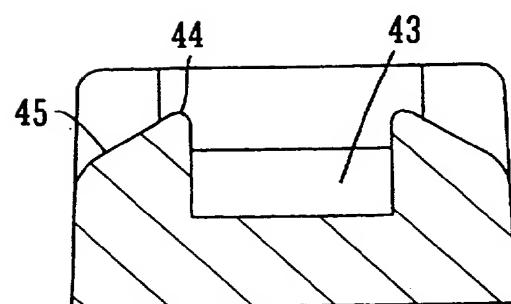


FIG. 6c

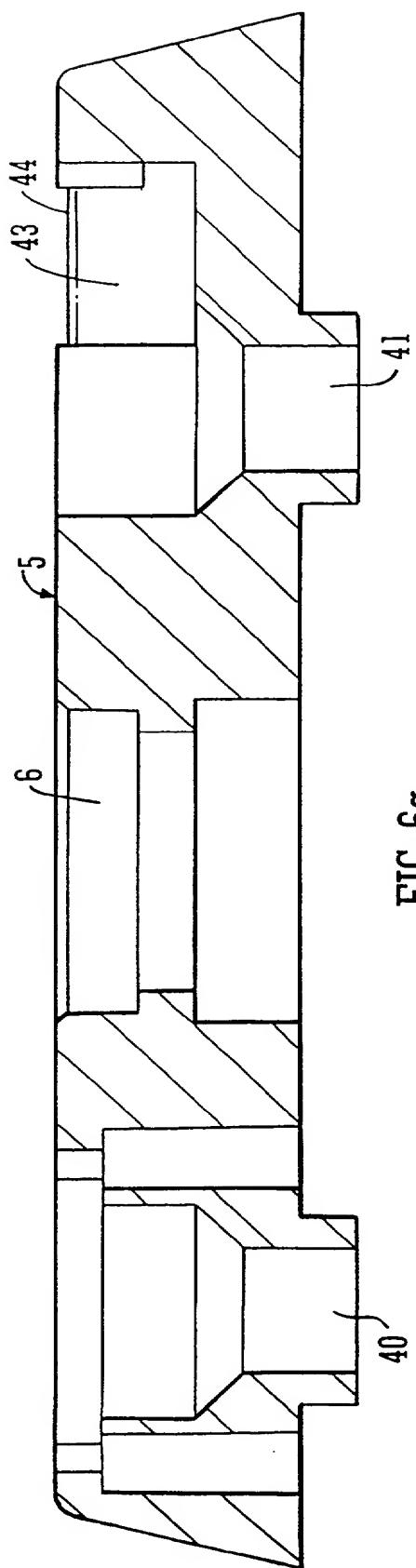


FIG. 6a

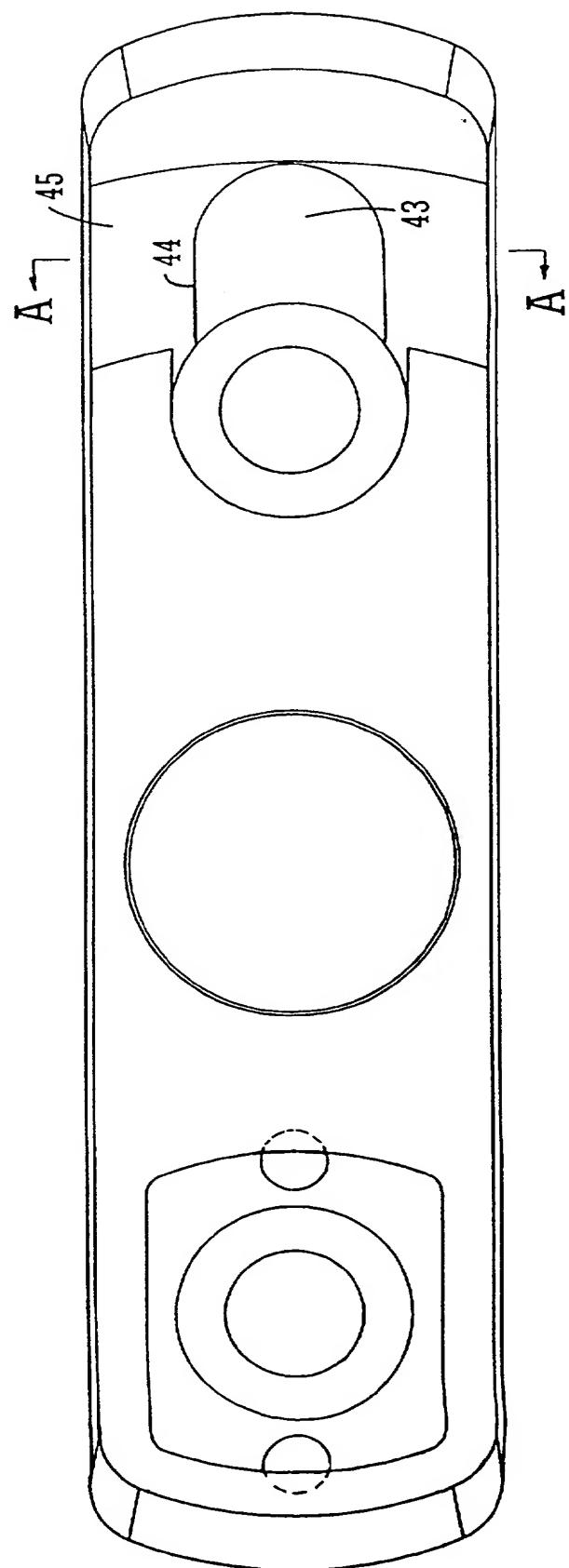


FIG. 6b

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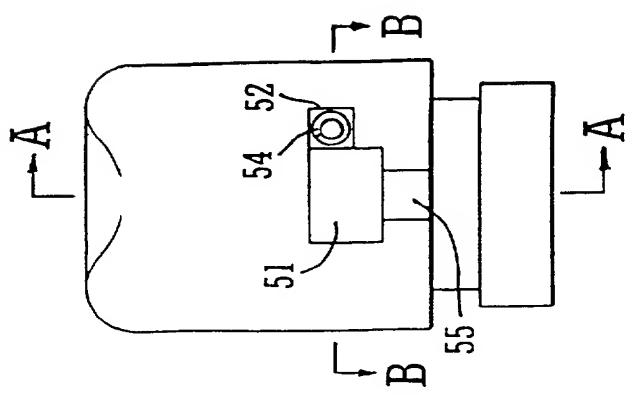


FIG. 7d

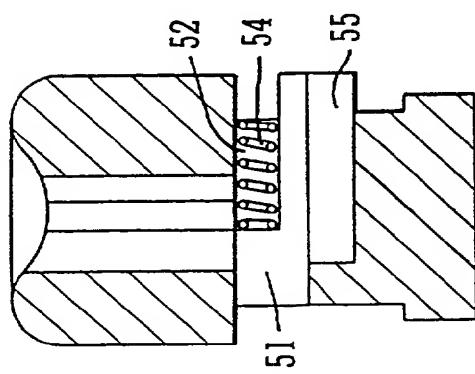


FIG. 7b

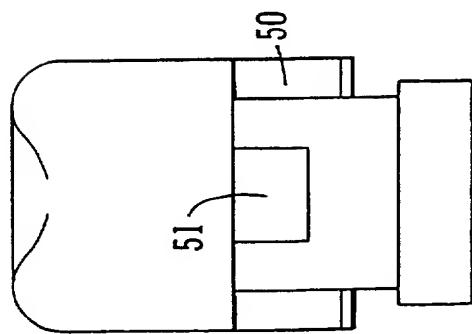
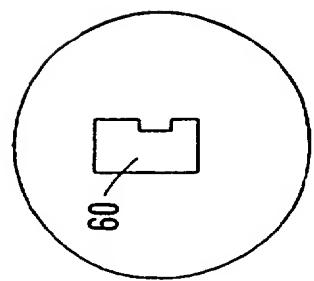


FIG. 7c



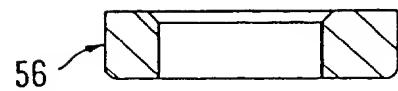


FIG. 8a

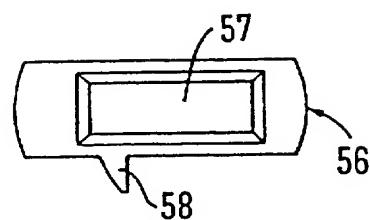


FIG. 8b

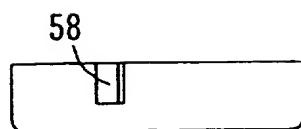


FIG. 8c

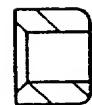


FIG. 8d

Positive Locking HandleTechnical Field

5 The present invention relates to handles for windows and doors and relates particularly, although not exclusively, to a handle having an espagnolette fastening, that is to say a fastening having two long bolts which operate in slots at the top and bottom of the window when the handle is turned.

10 Background Art

There have been many proposals for lockable handles for windows and doors, including espagnolette systems. GB-A-2, 326, 909 of the present applicant contains a discussion of the merits of a latch mechanism which latches when an espagnolette 15 handle reaches the correct fastening position, aligned with its base plate. It is noted therein that a latch mechanism may be expensive and complex to manufacture.

Disclosure of Invention

20 It is an object of the present invention to provide a handle that is economic to manufacture and simple to assemble, but which has a positive locking system.

The present invention provides a lockable handle assembly comprising:

25 (i) a handle body pivotally mountable on a substrate;
(ii) a cavity extending through the handle body and open towards the substrate;
(iii) a lock barrel slidable in the cavity parallel to the pivot axis of the handle and rotatable between a locked position and an unlocked position;
(iv) a bolt slidable in the cavity between an extended and a retracted position, the 30 sliding movement being parallel to but offset from that of the barrel, the bolt being spring urged to the extended position and having latching engagement with the substrate;

(v) a pivoted lever, one end of which is acted upon by the barrel and the other end of which engages the bolt ; and

(vi) a shaped closure plate for closing the cavity, said closure plate having structures integrated therewith and projecting therefrom into the cavity, one of said structures providing a fulcrum for the pivoted lever and the other providing a locking portion for engaging the lock barrel in the locked position.

5 Preferably the lock barrel has a surface configuration which engages the locking portion of the closure plate when the barrel is in one orientation but which is disengaged therefrom when the barrel is rotated through a certain arc, preferably 180 degrees.

10 Suitably the surface configuration of the barrel is a part- circular groove and the locking portion on the closure plate is a part-circular lip. Preferably both the groove and the lip are substantially semi-circular.

15 In the preferred embodiment, the closure plate also provides a washer portion to be mounted between the handle and the substrate about the pivot of the handle.

20 Preferably the handle assembly includes a keeper receivable in a chamber in the barrel and moveable transversely of the barrel between a projecting position in which a locking portion of the keeper projects from the barrel and engages one of two receivers in the handle body, and a housed position in which the keeper is withdrawn substantially inside the barrel, the keeper being moveable to and retainable in the housed position by a key inserted in the keyhole.

25 Brief Description of the Drawings

One embodiment of the invention is illustrated by way of example in the accompanying drawings, in which:

30 Fig. 1 is a longitudinal cross section through an assembled locking device according to the invention.

Fig. 2 is an underneath plan view of the handle.

Fig. 3 comprises views of the closure plate as follows:

- a) plan view
- 5 b) underneath plan view
- c) longitudinal cross-section
- d) fragmentary longitudinal cross-section of the pivot portion
- e) transverse cross-section on the line A-A in Figure 3a
- f) transverse cross-section on the line D-D in Figure 3a
- 10 g) end view, from the right hand end in Figure 3a
- h) transverse cross-section on the line B-B in figure 3a

Fig. 4 comprises views of the bolt, as follows:

- a) elevation
- 15 b) plan view

Fig. 5 comprises views of the pivot arm as follows:

- a) elevation
- b) view on arrow X in figure 5a
- 20 c) plan view

Fig. 6 comprises views of the base plate, as follows:

- a) longitudinal cross-section
- b) plan view
- 25 c) transverse cross-section on the line A-A in figure 6a

Fig. 7 comprises views of the barrel, as follows:

- a) side elevation
- b) rear elevation
- 30 c) cross-section on line A-A in figure 7d
- d) front elevation
- e) plan view

1 f) Cross-section on line B-B in Figure 7d.

Fig. 8 comprises views of the keeper as follows:

5 a) longitudinal section
b) plan view
c) side elevation
d) transverse section.

Mode for Carrying out the Invention

10

The handle 1 of metal, preferably zinc, comprises a grip portion 2 and a body 3 from which a pivot 4 projects. The handle is pivotally mounted on a base plate 5 which has a central aperture 6 to receive the handle pivot axle 4.

15

The body 3 defines a cavity 7 which is open downwardly. The upper and forward part of the cavity comprises a bore 8 in which the barrel 9 is rotatable. The bore has front and rear vertical receiver channels 10, 11 which extend downwardly from below an annular lip 12 at the top of the bore.

20

The rear portion of the cavity 7 is defined at its top edge by a platform 13 which is penetrated by a cylindrical recess 14 to receive a spring 15. As seen in fig. 2, the front edge of the platform 13 at one side 16 of the channel 11 is flush with the lip 12, while on the other side 17 of the channel 11 it has a radius similar to that of the front part of the bore 8.

25

These differences in the diameter of the bore permit the barrel 9 with a small portion of the keeper 56 projecting from it to be rotated from a locked position to an unlocked position in a clockwise direction (as seen in fig. 2), and from an unlocked position in anti-clockwise direction, but prevent rotation of the barrel through 360°.

30

The rear portion of the chamber 7 is formed as a semi-bore 18, co-axial with the recess 14. The body at its rear corners has two pins 19 extending downwardly.

The closure plate 20, shown particularly in figure 3, closes the cavity 7. It is suitably a moulded plastics component, more particularly made of glass filled plastics material, especially glass filled nylon which preferably contains about 30% glass by weight and is polished. The closure plate 20 has a front portion 21 formed as a washer which fits around the pivot 4 and assists the rotational contact between the handle and the base plate. The closure plate has two apertures 22 at the rear which engage the pins 19 projecting from the body. Forward of the apertures 22 there is a throat 23 through which the plunger 24 can slide. Forward of the throat there are two fulcrum supports 25, one on each side of the closure plate. The fulcrum supports 25 each have a semi-circular groove 26 at the top which provides the fulcrum for the pivot arm 27 (see below).

Forward of the fulcrum supports 25 there is a semi-cylindrical wall portion 28 standing upwardly from the support plate. This fits inside the bore 8. At the top edge of the wall portion 28 there is a semi-annular lip 29 extending radially inwardly.

The bolt 24 comprises a cylindrical portion with a nose 30 having a rounded edge. There is a flange 31 projecting from the bolt at the top, and an axial boss 32 extending upwardly above the flange. The boss 32 accommodates the spring 15. The bolt may suitably be of the same material as the closure plate or may be of metal.

The pivot arm 27 may also be of the same material as the closure plate 20. The pivot arm comprises an upper arm 33 joined at an elbow to a lower bifurcated arm 34 which is at an obtuse angle to the upper arm. Two pivot pins 35 extend sidewardly from the lower arm 34 near to the elbow. These pivot pins rest in the grooves 26 at the top of the fulcrum supports. The lower arm forms two fingers 36 which define a semicircular mouth 37, beyond which the fingers extend for a short distance tangentially. The lower arm 34 thus embraces the bolt 24 and engages under the flange 31. The upper arm is a plate having a curved top edge which fits inside the wall portion 28. The structure is reinforced by a rib 38 on the rear of the upper arm 33.

The base plate 5 (see fig. 6) has a central aperture 6 to receive the main pivot 4 and two screw apertures 40, 41 by which the assembly can be fixed to a base such as a window frame. The front screw aperture 40 can be covered by a snap-in cover-piece 42. The recess for the rear aperture 41 is extended rearwardly to form a well 43 which 5 receives the nose 30 of the plunger 24 when the assembly is engaged. The well 43 is defined by step portions 44 at each side which have ramp surfaces 45 sloping inwardly upwards.

The barrel 9 (fig. 7) comprises a generally cylindrical body with a cylindrical 10 collar 46 at its lower end. Above the collar the surface is recessed. At the front as seen in fig. 7a the surface of the barrel extends downwardly as a semi cylindrical skirt portion 47 so that only a semi-circular groove 48 is formed between the skirt portion 47 and the collar 46. The groove 48 receives the lip 29 of the wall portion 28, which locks the barrel against downward movement in its locked position. At the rear as seen in fig. 7a, 15 the recessed surface of the barrel extends upwardly to just above half the height of the barrel. This provides a slideway 49 for the lip 29 of the wall portion 28 when the barrel is rotated to the unlocked position (through 180° as compared to fig. 7a), so that the barrel can be pushed downwardly.

20 The rear edges of the skirt portion 47 form ledges 50 which define the slideway 49 and prevent rotation of the barrel when it is in the lower position.

The barrel is penetrated by a passage 51 which extends from front to rear, just 25 below the top edge of the slideway 49. To one side of the main passageway there is a groove 52 which extends inwardly from the front but is blocked by a pillar 53 at the rear. This groove 52 receives a small spring 54 which acts against the pillar 53. There is another groove 55 cut into the floor of the passage 51, into which the lead end of the key (see below) can enter.

30 The keeper 56 (Fig. 8) comprises a generally rectangular frame defining a rectangular aperture 57 through which the key can pass. The upper edge of the aperture 57 is chamfered. The keeper has substantially the same length as the diameter of the

upper cylindrical part of the barrel. The ends of the keeper are rounded on the same arc as the cylindrical surface of the barrel. At one side, a nib 58 projects from the keeper, with a depth about 1/2 that of the keeper. The keeper fits slidably in the passage 51 of the barrel and the nib 58 can enter into the mouth of the groove 52 so that the small 5 spring 54 acts against it.

The button on top of the barrel is penetrated by a key slot 60 which extends down to the passageway 51. A key 61 can be inserted into the key slot. The key has an inclined lead surface and pushes the keeper rearwardly against the action of the small 10 spring. Fig. 1 shows the key being inserted but it has not yet pushed back the keeper.

To assemble the unit, the pivot 27 is mounted on the fulcrum support 25, and the bolt 24 is inserted through the mouth 37 into the throat 23 in the support plate 20. The main spring 15 may be inserted into the spring recess 14 but preferably is mounted on 15 the boss 32, around which it makes a tight fit. The barrel with the spring-loaded keeper therein is mounted on top of the wall portion 28 with the lip 29 in the groove 48. The sub assembly of components is then inserted into the cavity 7 of the handle body until the pins 19 enter the apertures 22. The pins are pinned to hold the closure plate in position, closing the cavity 7. The handle assembly is then mounted on the base plate in 20 conventional manner and the base plate keeps the closure plate secured.

The unit is seen in Fig. 1 in the locked and fastened position with the barrel secured against downward movement by the lip 29, and secured against rotation by the end of the keeper 56 engaging in receiver channel 10 in the body while the bolt 24 is 25 captured in the locking recess 43. When the key is fully inserted through the keeper aperture 57 the keeper 56 is caused to withdraw into the barrel 9 to a housed position where only a small part of the keeper projects from the main cylindrical surface of the barrel. The barrel can then be rotated through 180° (clockwise in Fig. 2) by manual pressure on the key. After this rotation, the key can be withdrawn again and the keeper 30 extends under pressure of the small spring 54 so the end of the keeper engages in channel 11. The barrel can now be pressed downwardly by thumb pressure on the button, as the lip 29 slides in the slideway 49. As the barrel descends, it acts on the

upper arm 33 of the pivot arm 27, causing the pivot arm 27 to pivot on the fulcrum support 25 and to lift the bolt 24 by engagement of the lower bifurcated arm 34 under the flange 31, against the action of the main spring 15. The bolt 24 is thus retracted out of the locking recess 43 and the handle can be turned from its fastened position in line with the base plate 5 to an unfastened position on either side of the base plate.

The handle can be returned to the fastened position at any time because the nose of the bolt rides up the ramp surface 45 on either side of the base plate and retracts the bolt until it goes over the step 44, against the action of the main spring 15, which then causes the bolt to snap into the fastened position in the locking recess 43. This return to the fastened position can be achieved regardless of whether the barrel has been left unlocked or whether it has been locked by turning the key.

To lock the assembly again, the key is inserted and turned, anti-clockwise in Fig. 2. The barrel will not turn in the clockwise direction because the small projecting portion of the keeper will not pass the edge 16 of the platform 13. After rotation through 180 degrees, the key can be withdrawn and the assembly is locked in the position of Fig. 1.

The assembly has positive locking combined with a latch engagement of the base plate. The parts of the assembly other than the handle, base plate and springs can all be made economically and efficiently from the same filled plastics material. However if desired other parts, particularly the barrel and/or the bolt, may be made of metal. The handle, base plate and springs are desirably made of metal. The unit is easily assembled and is convenient to use.

The pivot arm or pivoted lever 27 is retained in the grooves 26 on the fulcrum supports by the barrel acting on one end of the arm and the main spring acting on the other end. Thus the pivot arm stays in position even though the handle in use is likely to be applied on a vertical surface (i.e. orientated at 90° to that shown in Fig. 1).

The words “up”, “down”, “upper”, “lower”, “front”, “rear” and the like used herein refer to the orientation of the locking assembly as shown in Fig. 1 and do not describe the working position of the handle. Such terms are used without limiting effect.

5

The words “comprises/comprising” and the words “having/including” when used herein with reference to the present invention are used to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

10

Claims

1. A lockable handle assembly comprising:

(i) a handle body pivotally mountable on a substrate;

(ii) a cavity extending through the handle body and open towards the substrate;

(iii) a lock barrel slidable in the cavity parallel to the pivot axis of the handle and rotatable between a locked position and an unlocked position;

(iv) a bolt slidable in the cavity between an extended and retracted position, the sliding movement being parallel to but offset from that of the barrel, the bolt being spring urged to the extended position and having latching engagement with the substrate;

(v) a pivoted lever, one end of which is acted upon by the barrel and the other of which engages the bolt; and

(vi) a shaped closure plate for closing the cavity, said closure plate having structures integrated therewith and projecting therefrom into the cavity, one of said structures providing a fulcrum for the pivoted lever and the other providing a locking portion for engaging the lock barrel in the locked position.

2. An assembly according to claim 1 wherein the lock barrel has a surface configuration which engages the locking portion of the closure plate when the barrel is in one orientation but which is disengaged therefrom when the barrel is rotated through a certain arc, preferably 180 degrees.

3. An assembly according to claim 2 wherein the surface configuration of the barrel is a part-circular groove and the locking portion on the closure plate is a part-circular lip.



Application No: GB 0014710.8
Claims searched: 1-7

Examiner: David Glover
Date of search: 25 October 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): E2A (AARF, AARG, AARJ)

Int Cl (Ed.7): E05B 1/00, 13/10, E05C 1/00

Other: Online: EPODOC, JAPIO, WPI

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|---|--------------------|
| A | GB 2326909 A (Daly) | |
| A | GB 2309997 A (Plus Plan) see page 3 lines 7-11 | |
| A | GB 2297799 A (Paddock Fabrications) see page 5 lines 23-27 | |

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| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
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